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ABSTRACT

The focus in this working paper is on the process of mediation through which occupational facts/data become part of a personal educational process. Numerous points are covered: (1) the relationship between media and mediation; (2) vocational development as a goal of occupational information mediation; (3) personal responsibility for goal determination during the mediation of occupational facts/data; (4) prospects for technology and commerce in the mediation of vocational development for vocational maturity; and (5) the challenge which the new concept "mediation of vocational maturation" provides for counselors. The authors believe that a new era in vocational guidance is beginning, one during which new knowledge in vocational development and media can be effectively and advantageously controlled by computers toward the goal of mediating vocational maturation with its emphases on personal growth and self-determined choices. (TL)

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INFORMATION SYSTEM FOR VOCATIONAL DECISIONS

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PROSPECTS FOR TECHNOLOGY AND COMMERCE IN THE MEDIATION OF VOCATIONAL DEVELOPMENT FOR VOCATIONAL MATURITY

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Recent Developments and Current Prospects

in Occupational Fact Mediation

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Recent Developments and Current Prospects in Occupational Fact Mediation[1]

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The Subsumption of Media by Mediation

From Media to Mediation. Our Conference host, David Pritchard, originally invited Tiedeman to report on recent media developments associated with the presentation of occupational information. He demurred from Pritchard's initial suggestion, however, because, upon hearing it, he realized more clearly that mediation, not media, is the central focus for education. The turning of occupational facts/data[2] into information is a personal and educational process. Therefore, the important question in relation to media in occupational information is the means by which media actually prove to mediate the personal educational process. We elect to address herein the most important of our questions in vocational guidance; namely, how may we better the personal educational process associated with vocational development?

Shortly after Tiedeman's conversation with Pritchard, he had a confirming experience with a recent book by McLuhan and Fiore. The younger of his sons left his copy of this book on a table in their

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1. Speech, National Conference on Occupational Information in Vocational Guidance sponsored by the U.S. Office of Education, Chicago, Illinois, 17 May 1967.
2. Occupational facts/data come in two conditions, fixed and modifiable. We therefore elect to adopt the cumbersome term,"facts/data", to indicate this fact throughout the paper. Occupational facts are directly recoverable without mediation except for storage and later recovery. On the other hand, occupational data must be additionally processed by the numeric and/or linguistic routines of a mediation system.

living room for about a week but he was not particularly interested in it because, during his early glances at it, he kept reading its title as The Medium is the (Message). That seemed a clever, though not an intriguing, title. One day it suddenly came to him that the book's title is actually The Medium is the Massage (McLuhan and Fiore, 1967), not the Message. His double take and that realization connected then with his realization that he had agreed to speak to you on mediation. Thus, a hurried turn to the book reinforced his recognition that, in occupational information as well as in the generality of communication treated by McLuhan and Fiore, the media are not the message. In fact, media can never be the message; only the facts which media convey are the message. The media themselves only become important in message transmission when they actually mediate transmission - when they actually massage the occupational information process as persons are exposed to occupational facts/data.

Epistemology and Pedagogy in Mediation. We introduce these experiences of Tiedeman's, namely those with David Pritchard's initial invitation and with the McLuhan and Fiore book, in order to place our report on recent media developments within a conceptual framework on which we had both been previously working independently but now find that we can herein express collaboratively. We feel that our new common framework is of considerable importance in determining the significance of current work in media development. Why?

The point of view we outline in this paper is one which derives important aspects of its validity from being realized again and again

through a wide range of personal experiences with facts and ideas. We try today to give you that important personal experience of discovery, insight, and acquisition because you can if you try really understand yourself as a process. Our "frame of reference" with regard to the interplay of facts, ideas, purposes, and action represents what we understand Polanyi to mean when he speaks of personal knowledge; that is, a form of orientation which, while it cannot be specified in the abstract, serves in any given context of personal encounter to articulate immediate concerns with issues of broader relationship and relevance (Polanyi, 1958). Therefore, in order to articulate aspects of our immediate topic within a context of issues of broader educational concern, we shall address ourselves herein to two assumptions which we consider implicit to much of the work in this field today - assumptions which, however, we consider to be inconsistent both with crucial principles of educational process and with the rationale of one of the developments to be reported, namely, the Information System for Vocational Decisions (hereafter ISVD) project.[3] We state these assumptions now so that we may substitute in later sections their inconsistency both with present work and with the ISVD. It is the alternatives to these principles that you will find us building into the ISVD.

The first of these assumptions pertains to the nature of knowing and the known. There are current applications of recent media developments to issues of vocational information which appear to presume that

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3. Principal Investigators in the Information System for Vocational Decisions are Russell Davis, Richard Durstine, Allan Ellis, Wallace Fletcher, Edward Landy, Robert O'Hara, David Tiedeman, and Michael Wilson.

facts, data, or information consist of bits of knowledge which correspond directly to that presumed to be the real, the true and the knowable. In brief, knowing and the known are presumed by these efforts to comprise a direct, linear relationship, both in the abstract and as we realize them as dimensions of particular circumstances. An acceptance of this assumption invokes an epistemology stemming from the great English Empiricists, Hobbes, Locke, and Hume and in our sciences finds perhaps its most thoroughgoing implementation through the rationale and methods of those guided by logical positivism. It represents, however, a position of which we shall show the serious limitations as we attempt to implement our current technological resources in the service of personally-determined career development.

The second of the assumptions is in an important sense subordinate to the first, for it pertains to the nature of the relationship between acts of knowing or learning and those of teaching or counseling. This assumption suggests that, on the basis of a "correspondence" theory of knowledge, we can presume to select those aspects of the known and knowable which shall be most effective in determining a subsequent course of events toward an end that we value and which, as "means" toward that end, we call "learning." In brief, the assumption here is that we can determine, in advance, both goals and procedures appropriate to the educational process in its distinctive human immediacy and variability.

These two assumptions, one "epistemological," and the other "pedalogical," are inconsistent with what seems to be one of the most crucial principles of our own current work, namely, that both knowledge and the

process of knowing are functions of a personal and collaborative context of exploration and confirmation - a context which is itself defined by a nexus of human purposes expressed both overtly and covertly, both tacitly and articulately. The alternative position from which we speak suggests that our talk about media cannot look in one direction only. It cannot look solely toward facts, data, information - in isolation from persons and processes. In short, we hold that the reciprocal interaction between the knower and known entails a "transactional" perspective and array of procedures more aptly denoted by the notion of mediation. The final turn of this argument is that, because of the interplay of the tacit and articulate dimensions of knowing in the personal act of learning, the experience of mediation is that of a massage. In other words, we inevitably encounter the new with a habitual tensing of our intellectual musculature, with the result that its meaning takes initial form after that which we have long known and accommodated ourselves to. Only after we have worked with (and perhaps more importantly still, been worked on by) a new possibility do we relax to the point of seeing more clearly that something new has indeed been going on in, as well as around, us /cf. Piaget (Flavell, 1963) on assimilation and accommodation/.

Our advocated perspective is "transactional" by virtue of the implication that both processes of teaching and learning are construed as individual and collaborative acts of "sampling", from among a wide range of on-going events (both personal and environmental), those configurations of meaning and implication which best serve to differentiate

means and ends, processes of imagination and structures of knowledge, and acts of discovery and principles of verification. Within this "transactional" perspective facts, data, and information derive their significance as exemplifications of meaningful coherence among stable dimensions of events reflecting multiple principles of order (Neisser, 1963). It is this transactional perspective regarding the interplay of information and imagination which brings our ideas in harmony both with current developments in discovery teaching and the "new" curricula (Bruner, 1966) and with the "new" self-knowledge and creative learning developments (Kubie, 1958). It is, in sum, a point of view from which we risk inviting the student to take advantage of our capacity to learn through his ability to teach us.

You are provided in the handout a summary of recent media developments associated with the presentation of occupational information (see Appendix A). This is the particular summary which David Pritchard originally wanted us to provide. Therefore, we accommodate his need but by way of your later reading, not present listening.

We are now thereby free to devote the balance of our report to tracing the emergence and implications of our "transactional" or "mediating" perspective regarding those developments. This point of our view has never before been reported. In presenting our point of view for evaluating the application of media to issues of occupational information within the context of personally-determined career development, we shall stress three "facts," namely:

1. The subordination of the concept of media to the concept of

mediation implies that, in relation to occupational information, media represent means in the service of vocational development. Thus the first "fact" to be developed more fully is that of occupational mediation in relation to the cultivation of vocational development.

2. The concept of vocational development as the goal of occupational mediation raises the issue of personal responsibility and involvement in the determination of those ends. This is the second of the "facts" within the context of mediation to be considered.

3. Finally, a discussion of vocational development and occupational mediation within the context of formally organized educational structures raises issues with respect to broader implication and implementation. Thus the third "fact" to be discussed is our responsibility and opportunity to consider means by which mediation of vocational development can be more effectively accomplished for all citizens of the United States through the engagement of systems and structures beyond those formally organized for educational purposes.

Vocational Development as Goal of Occupational Information Mediation

Vocational Development. The past twenty years mark profound change in vocational psychology. Ginzberg and colleagues seemingly

led us into this new era with their book on the process of occupational choice (Ginzberg, Ginsburg, Axelrad, and Herma, 1951).

Although the Ginzberg study received the most attention in the beginning, the study was itself also a part of an emerging elaboration of the concept of vocational development by Donald Super. Super began the incorporation of the psychology of adjustment into the psychology of vocational choice just prior to World War II. His consultation with his Columbia colleagues during the Ginzberg study seemingly helped him to crystallize this union of vocational choice and adjustment and to formulate that union in 1953 as a theory of vocational development (Super, 1953). Super followed his 1953 statement of vocational development theory by numerous papers, several monographs, and his book The Psychology of Careers (1957). Super's theory of vocational development is by now solidly foundational for practice.

Super's original basis and theory in vocational maturation is now also being consolidated and expanded by Crites (1965) who is developing an elaborate series of scales in vocational development and an extensive plan for further investigation of the possibility of turning vocational development into vocational maturation. Gribbons (1959) has also given us a scale of vocational readiness as a part of vocational development. Gribbons and Lohnes (1966) have also already theoretically and empirically linked several important vocational consequences to vocational readiness during the high school period of life.

Vocational Choice. These three lines of research in vocational development itself have been coincident with three sister lines of

research in vocational choice. The research in vocational choice is characterized in its broadest outline by the work of:

1. Cooley who contributed his overlapping, longitudinal study (1963) of the development of scientific careers, Flanagan and Cooley (1966) who have carried on Cooley's initial efforts at prediction of educational and vocational choices in relation to the analysis of Project TALENT; and Shea (1964) who has carried on Stoffer's interest in educationally breaking the social inheritance of occupational behavior.
2. Roe (1956) who related categories of occupations to the variations of personality and intelligence in our society, Holland (1964) who extended that work and derived scales of personality which convey later membership in occupation to some extent, and Campbell (e.g. Campbell and Johansson, 1966) who is engaged in modernizing the concept of interest as inventoried by the Strong; and
3. Bordin, Nachman, and Segal (1963) who enunciated a need satisfaction framework for the mediation of vocational memberships in personality development.

Vocational Self Concept and Career in Personality. The further differentiation of theory in vocational choice according to the concept of vocational development finds strong expression in research on vocational self concept. Some of the better delineated lines of research on the harmonization of personality and work through the development of a vocational self concept are those of:

1. Super and associates (1963) in which the meta-dimensions of self concept are being defined and studied;
2. O'Hara and his students (1967) in which the development of self awareness through attention to vocational choice has centrality;
3. Harren (1964) in which pragmatic means for studying the Tiedeman and O'Hara (1963) stages in development of educational choice and accommodation have emerged;
4. Matthews and Friend (in press) in which the specific development of vocational behavior in the personality development of women is at issue; and
5. Lofquist and associates in which specific hypotheses from their general behavioral theory of vocational choice and adjustment (Dawis, England, and Lofquist, 1963) are being tested.

In modern vocational psychology the development of career in personality finds union also with the concept of socialization, with revised educational practice in relation to the "new curricula", with studies of the organization as a specific sociological unit, and, finally, with the total economy as a frame and vehicle of vocational and career behavior.

Vocational Maturation: A New Goal in Occupational Fact Mediation. Clearly, we have moved far beyond the vocational psychology of World War II which was primarily based on the prediction of success and/or satisfaction in educational and vocational opportunities. Vocational choice is now nested into vocational development, vocational development

into self concept and personality development, personality development into curriculum development and socialization, and finally organization and economy are emerging as two powerful forces occurring in interaction with individual initiative to forge vocational identity. If you share our conviction that we presently have both an enlarged and a sound basis for theory in vocational development, then we trust that the following two conclusions will have credibility for you, namely:

1. We presently have a new goal for occupational information, that of vocational development, not mere occupational entry and success; and
2. Our enlarged understanding of vocation in personality now gives us social as well as individual means whereby we may "massage" those research facts of vocational development which we have sketched for us in the interest of more fully helping persons turn those facts into occupational information for themselves. When persons do so they move toward vocational maturity. Vocational maturity is a goal we expect that persons will accept on a personal basis.

Personal Responsibility for Goal Determination During the Mediation of Occupational Facts/Data: Needed Structure of Authority in Turning Development into Maturation

Personal Responsibility and Vocational Maturity. The previous section concluded with statements that vocational development has become an appropriate goal for occupational information and that the

theory of vocational development is sufficiently advanced to give us a new concept of what we actually need to mediate, namely, vocational maturity. We know, and our critics keep insistently drawing our attention to the fact, that the society, its economy, and its organizations help persons to harmonize initiative and efficiency during the course of personal evolution in vocational identification and personality development. However, we counselors and other educators still have a staunch interest in cultivating individualization during the course of the socialization of that collaborative activity known as work. Our resolution on this score brings personal responsibility for goal determination into the mediation of occupational facts/data and maturation into fore as goal of vocational development. Personal responsibility for goal determination is a necessary part of personal development through the educational process. Therefore, it must remain a central index of our success in bringing the goal of vocational development into the mediation of occupational information for the purpose of cultivating vocational maturation. Let's now attend to this fact more carefully.

Personal Responsibility and Pedagogy. The strategy for cultivating personal responsibility during education has one of its foundations in the pedagogy of discovery teaching such as Bruner (1962) recommends. In discovery teaching, goals and structures which are originally those of the teacher are offered to students with expectation that the student will incorporate them into his own response repertoires. This pedagogy recognizes that the process of incorporation mediates the responsibility of the student as he takes a structure known to another and

make it his own. During this process the student himself discovers the teacher's structure, thereby achieving insight into the subject which the teacher offers him for his understanding.

The pedagogy of discovery teaching tutors the student in seeing a teacher's undertanding of a phenomenon in relation to the teacher's own desire to share that understanding with him. This pedagogy expects that there will be a placing of shared goal determination into the awareness of the student. It also offers the student practice in determining specific, personal goals within a general set, or range, of goals permitted by the structure of the teacher's subject as well as by the personality of the teacher involved in letting another learn by himself within broad limits defined by the teacher.

The pedagogy of discovery teaching opens the door for individual action during learning. However, the application of goal determination to other areas of living involves the assumption of initiative in goal determination in the absence of a pre-determined set of possibilities. This is the process of generalizing a discovery pedagogy upon which counseling focuses. The matter of choice becomes central in personal goal determination.

Guidance in Education and Vocational Maturity. Tiedeman recently applied the above analysis of the functions of guidance in education (Tiedeman, 1966) to an analysis of the general choice conditions inherent in the process of maturing. The results of this analysis led him to emphasize that choice involves the bearing of the predicament of commitment with tentativeness (Tiedeman, 1967). In this analysis

of the paradox of choice conditions, he differentiated two central issues. One central issue surrounds the actual assumption of responsibility to relate oneself to future opportunity as if there is an avenue of possibility and responsibility available to one. This issue Tiedeman calls that of choice determination. The second central issue is his analysis of choice conditions deals with the evolution of goal, given the assumption of responsibility to choose. This condition he refers to as that of goal determination.

Tiedeman's recent writing on the understanding and bearing of the choice paradox as a central and critical part of self development represents a culmination of the work he initiated with O'Hara in 1963, work which itself produced the monograph, Career Development: Choice and Adjustment (Tiedeman and O'Hara, 1963). In that monograph, he and O'Hara analyzed career development in relation to a model of decision-making. Since that time, Tiedeman has himself worked with subsequent students, Frank Field (Tiedeman and Field, 1965) and Gordon Dudley (Dudley and Fletcher, 1965) to delineate a way in which he could argue for the articulation of decision-making structures in individual lives without threat to the individual right of goal determination during process of personal decision-making. Tiedeman believes that he now has a logical system which is both possible and appropriate. The system is that of mediation as we develop it here today.

A Structure of Educational Authority Appropriate for Vocational Maturation. The central part of our position is that the cultivation of understanding of decision-making in the paradox of living takes place

in an educational context. In the educational context involving the discovery pedagogy the responsibilities for efficiency and initiative can be divided between counselor and teacher.

The teacher has prime responsibility for the goals of accuracy and discovery with particular respect to the subject he is assigned to teach. The teacher is only secondarily interested in the emergence of insight on the part of his student during course of discovery as well as in growth in understanding of self-as-process under expectation for personal responsibility in learning.

The counselor on the other hand has primary responsibility for seeing that the goals of insight and self-as-process emerge in the context of discovering a subject at school and in generalizing this awareness to contexts of choice in vocation and life in which goals can only be determined personally. The counselor in his turn has secondary interest in those goals which are primary for the teacher, namely the goals of accuracy and discovery in relation to subjects. The counselor is interested in sharing only the expectation that the student will both be accurate and have discovered but he cannot deny these functions in educational context however much he personally favors the emergence and exploitation of personal initiative in students.

The application of this model of responsibility assigns to the counselor an interest in seeing that discovery teaching is part of the educational establishment in which he is employed. The model presumes, in addition, that the counselor will have a teaching interest in the paradigm of decision-making as it has application both to choice in

vocational and other life goals and to learning about self during the course of experiencing and modifying the consequences of a personally-elected goal. For this reason our expectation is that explicit teaching in decision-making should be a part of the guidance program of an educational institution. Tiedeman intends to make the teaching of decision-making explicit in counseling as you will see from his description of the Information System for Vocational Decisions (Appendix B). This system represents Tiedeman's current effort to act upon the understanding of the model outlined here.

Finally, the appreciation of choice paradox in life evolves over a period of time. In this time, the explicit concepts of decision-making become more practiced, understood, and automatic. The critical tasks of the counselor towards these ends are to analyze the <u>projections</u> about choosing in which his students engage. The two conditions of choosing in which projection must be analyzed are those previously designated, namely choice-election, and goal-determination. In either case the counselor has interest in ministering to projections of either an internal or an external kind. The counselor attempts to mediate to the internal projections of <u>guilt</u> in ways such that his inquirer's attention to his own initiative and his practice of action under guidance of his initiative does not have anxiety and/or psychosomatic effects. The counselor attempts to mediate the external projections of <u>shame</u> so that blame becomes effectively assessed by an inquirer engaged in such projections. The counselor's goal is to bring about greater awareness of evaluations and process possibilities for the inquirer

during the course of discussions of such projections.

We presume you note our tri-partite contribution to the theory of personal development through vocational development in this discussion. We believe that the mediation of occupational facts/data in an effort to turn them into occupational information for which an inquirer is personally responsible requires all three enumerated conditions: namely, 1) a structure of educational organization in which there is the expectation of personal discovery and the division of teaching and counseling responsibility in which this can go on without serious threat to the individual initiative and responsibility of the students; 2) an explicit teaching by counselors and/or teachers of decision-making, particularly educational and vocational decision-making, such explicit teaching being offered in compatibility with the discovery teaching in other subjects; and 3) an evaluating and/or monitoring system which is explicitly attune to the development of choice behavior in inquirers.

Prospects for Technology and Commerce in the Mediation of Vocational Development for Vocational Maturity

From Theory to Technology in Mediation. It is one thing to enunciate both a new goal and the structure of authority which will be required to attain that goal without serious threat either to individual liberty or to societal disintegration. These matters have been attended to in the prior two sections. It is still another thing, however, to say how vocational maturity can be cultivated within the required

structure of authority. We do believe, however, that we have hit upon a good means to our end. That means will be the Information System for Vocational Decisions as it is described in detail in Appendix B.

Occupational Fact Mediation in the Environment of an Information System for Vocational Decisions. As you will note in Appendix B, the ISVD will be fashioned to mediate choice behavior. Several aspects of that system bear particular emphasis within the context of our immediate considerations here.

One aspect of ISVD in need of special attention is that our word "Information" denotes the placing of facts/data into the context of use. Thus the user or inquirer becomes an explicit part of our denotation of "system." We intend to place a student in potentially repeated interaction with a computer-centered environment programmed, not for prompt reinforcing of stimulus-response contiguity, but for an inquirer's personal inquiry.

A second noteworthy aspect of ISVD is that it will be constructed so as to facilitate an inquirer's learning how to harmonize his personal goals and their consequences in a real world by means of repeated inquiries in specific realms of social activity. Because the ISVD will put the inquirer in direct relation with his evolving history and intentions to the extent that such can be motivated and represented through the numbers, letters, and processing available in computer reckoning, it becomes possible to belie the fears of those who view such automation as a process for making decisions for, rather than with, people.

This brings us to the third and final particularly noteworthy

aspect of ISVD. Our primary professional task, both in ISVD and even more generally in guidance, is the construction of a meta-system which permits analysis and response in terms of the majority of the variables of anticipated personal determination. For, in sum, the ISVD will represent a first-time physical simulation of the "outside" which a person must first learn to bring "inside" and then to act toward knowing that it is there but knowing also that he need not be "driven" by it, that he can place it in the service of his own personally-determined career development, in the service of his present and evolving maturity.

A Structure for Mediation of Vocational Maturation in the ISVD. Three specific parts of the ISVD will define its particular contribution to the needed process of mediation. One of the specific mediational parts of the ISVD are the media themselves. The ISVD will attempt to take advantage of all the gains in mediation now available to us because of the media-work outlined in Appendix A. The output media designed into the ISVD will include films, film strips, slides, taped messages, and printed reports provided by means of both cathode ray tube and hard-core printer. Input media will include both the typewriter keyboard and the light pen operating in conjunction with the cathode ray tube.

A second mediational part of the ISVD will be its materials. The materials of ISVD will include the best of findings in vocational development and career linking as outlined in the second section of this paper and in Appendix A. Also included will be materials on opportunities, their characteristics and projected possibilities. Finally,

materials will include a newly constructed curriculum designed specifically for the mediation of the developmental tasks of career decision-making and development.

A third mediational part of the ISVD will be the computer modulation of access and response in a time-shared mode. The modulation of the totality of formally construable career development through computer control brings timing and supervision into focus in the mediational process for vocational maturation. Timing will be important in terms of 1) frequency of access, 2) sequence of item presentation and data processing and the monitoring of response to same, and 3) intervals between all three kinds of parts. Supervision has importance in terms of 1) the monitoring built into the inquirer-machine interaction itself, 2) the monitoring of the counselor in his supervision of the inquirer-computer interactional environment, and 3) the monitoring of the vocational educator as he engages persons in the tasks of role assimilation which follow upon the making of a vocational choice, however tentatively that choice is held, and the undertaking of vocational preparation.

The ISVD will be on the frontiers of all three realms of the mediational process designed for vocational maturation. However, as indicated in Appendix C, the ISVD will not be alone in any of its approaches to this condition. University and other non-profit organizations with personnel for technological development in education and profit-making organizations with similar staffs all now have at least one representative case participating in developing the parts of the mediation needed for vocational maturity. There is a considerable

mass now existing for creation of occupational fact mediation. In conclusion, let's look at the potential economy of such mediation as we also first swiftly review our argument in its totality.

An Economy for Mediation of Occupational Facts: The Counselor and His Mediation of Vocational Maturation

Summary and Challenge. McLuhan and Fiore use their book, The Medium is the Massage, to convey awareness of a quoted statement attributed to A.N. Whitehead; namely, "The major advances in civilization are processes that all but wreck the societies in which they occur." We elect to summarize and conclude on this profound and somber a note.

We have attempted today to make us all aware that we are on the frontier of a new era in vocational guidance. This new era can combine the recent knowledge in vocational development and media which we have gained in order to mediate vocational maturation by massage of self development with the timing and logical processing available in wedding vocational development materials and media presentation under computer control of a great deal of that mediation. Our realization of this new possibility in our society would constitute a major professional advance on the order of the civilization advances to which Whitehead alludes. Maturation for self awareness in career constitutes a change in our civilization not now accepted in our educational and labor establishments. If we can conceptualize that advance, advocate it, demonstrate it, and sell it we will have massaged ourselves and our society so that we may

all but wreck both. However, we remind us in conclusion, that the mediation of this process of incorporation of change is the professional forte of us counselors. Therefore, we remain convinced that we all can both incorporate the change we have outlined into our own repertoires and personality and see that the new technology can mediate vocational maturation for all citizens without disaster in our society. It's worth a try. It's now within the realm of our possibilities.

A New Frontier and Its Needed Economy. Government and profit, as well as technologically grounded non-profit, organizations are now each carefully scrutinizing the technology associated with counseling and guidance (see Appendix C). Under such scrutiny, interest, and potential competition, our guidance technology is likely to experience marked change in the near future, probably within the next five years. Let's not be frightened of this potential for change. Let's get ourselves informed of it. Let's keep watch over its theory and thereby give direction to its evolution. We believe we all can do so if we remain interested in mediation for vocational maturation, not just in media for vocational development.

A prime question in the changes which are on our frontier have to do with the construction of an economy in which industry can profit. We do not mean to frighten you counselors, but we do suggest that we stay loose as this economy is reformed. There will be more than enough compensation for each of us. But what is needed?

Marvin Adelson, System Development Corporation, recently only half jokingly suggested to the Panel on Counseling and Selection,

National Manpower Council on which he serves, that the government pay career development money directly to citizens on a regular basis in the future, not to counselors. Such an economy would put us counselors into competition for the governmentally-subsidized money of citizens who could then be accurately conceived as our customers and could thereby gradually but more definitely correct any of our misunderstood theories and practices. This economy would also permit the insertion of computer-assisted support systems for vocational decisions into the technology of which our improved service to users could be founded.

Preposterous? Possibly. However, we are on the brink of a revolution in our field. New solutions are bound to be needed. Let's not fight them; <u>let's mediate them</u>!

APPENDIX A

A Partial Inventory of Developments in Mediation in Which the Media Themselves are the Things

Robert Campbell who is responsible for studies in vocational guidance at The Center for Vocational and Technical Education, The Ohio State University was host to a 1966 invitational conference in which the system mediation of vocational development was the theme. Ann Martin, University of Pittsburgh, was co-instigator of the conference. Tiedeman chaired it (see Campbell, Tiedeman, and Martin, 1966). We invited participants who were known to be at work on the mediation of occupational facts/data.

The projects considered in that first conference have since been augmented by two others at a subsequent meeting of the Invitational Conference. However, the two additional projects still fit into the tri-partite framework in which Tiedeman was able to understand the work in media of those who originally met. Therefore, we use his original framework in reporting the research known to us which is currently underway in the mediation of vocational development. We merely fit the additional work into that original framework.

A. Research in Careers. One group of studies represented at the Invitational Conference consisted of studies a) of vocational choice, success, and satisfaction; and b) of instrumentation involved in the study and potential cultivation of vocational development. Included

in this group at the Invitational Conference were:

1. Project TALENT. William Cooley and Paul Lohnes represented Project TALENT in this Conference. The reports now coming from the Project represent our best available pragmatic indications of the factor structure of aptitude and interest measures and of the relation of those factors to career elections and career trees. The Project also offers many working multivariate computational routines which will be needed in any on-line computer mediation of career research and/or development.

2. A Study of Intellectual Growth and Vocational Development. This project of the Educational Testing Service is under direction of Thomas Hilton with the assistance of William Godwin among others. The study will relate Hilton's paradigm of decision in vocational development to intellectual growth. The intention is to explore choice development within cognitive development.

3. Related studies not represented at Conference. Vocational maturation as a goal for the mediation of occupational information arises from the Career Pattern Study under direction of Donald Super, the Studies of Vocational Readiness Planning under direction of Warren Gribbons, and the Study of a Vocational Development index under direction of John Crites. The latter two of these continuing studies are funded by the Office

of Education. The Super studies have been funded by various sources. Some of Super's studies are now being supported by a small grant from the College Entrance Examination Board. Each of these studies provides both theoretical foundation and empiric data for the mediation of vocational maturation with a computer-based interactive environment.

The CEEB has also underwritten some of the work of Robert O'Hara and Esther Matthews. The studies of both of these investigators has direct relevance to the foundation for career development which is involved in the mediation of occupational information.

A present large study of channels of access to post-secondary education is being done at the Center for the Study of Higher Education, University of California, Berkeley, under direction of Dale Tillery and with considerable financial support by CEEB. This study, School to College Opportunities for Post-secondary Education (SCOPE), will be a five-year longitudinal investigation of patterns of access to post-secondary education. The research is being conducted in four states and will offer solid foundation for conceiving the transitions from secondary to post-secondary education.

Kenneth Hoyt is also contributing to understanding of this transition from school to post-secondary education through his Vocational Specialty Testing Program. That Program is

providing validity patterns in direct relation to many vocational specialties.

B. Occupational Information, Problem-Solving, Media, and Their Effects in Vocational Development. This second group of studies encompasses the largest group of interests among the participants of the Invitational Conference. These studies represent a rudimentary transition from the theory of vocational development to the problem of mediating occupational information so that vocational development can be further cultivated. Since each study is singularly defined by its own specific interests, no one of the studies in this group is now conceived as part of the systematic mediation of vocational maturation.

1. Occupational Information. One sub-set of this group of studies is specifically dedicated to the assembly and presentation of occupational information per se. One study in this sub-set is being conducted in New York under direction of Alan Robertson and George Dubato. This study provides a model for collecting occupational information of direct relevance to a local labor market. It is also concerned with judgements about the importance of facts/data so that such information can be presented in a parsimonious and effective manner.

A precursor of the New York State Study is being conducted at San Diego under direction of Glen Pierson. This San Diego study is also involved with the collection and effective presentation of information of direct local impact. The study

additionally relates itself to the problem of file maintenance and presentation. The San Diego information is presently on microfilm which can easily be recovered because each microfilm is attached to a coded and pre-punched Hollerith card.

2. Media. A second sub-set of these technological improvements in the mediation of vocational maturation has to do with media themselves. Two of the studies in this sub-set are under direction of Thomas Magoon, University of Maryland. One of Magoon's studies involves the construction and trial of single audio messages conveyed by message-repeater tapes. A second of the Magoon studies involves the expansion of this single-message technology into a multiple-message technology. Magoon now has a 23-track tape mechanism under trial.

A more general study of media is under direction of Ann Martin at University of Pittsburgh. The Martin study involves the construction and trial of occupational information using several media simultaneously. Slides, film-strips, and movies particularly interest Ann Martin at the moment. The Martin materials are being developed within a broad theory concerning the harmonization of work, education, and self and with the needs of non-college youth in specific focus.

Keith Whitmore has been an interested participant in the Invitational Conference. Whitmore, an employee of the Kodak Company, is listening to our Conference conversations in order to guide the resources of the Kodak Company into possible

entry into counseling and guidance support systems.

3. Problem-Solving and Vocational Orientation. John Krumboltz is engaged in what is likely to become a widening series of investigations of problem-solving experiences which stimulate career exploration and interest. Krumboltz has already constructed and tried kits which highlight the central problem-solving functions from each of several occupations. This work expands his work in decision-making in which he collaborated with H. B. Gelatt, Murray Tondow, Barbara Varenhorst, and William Yabroff at the Palo Alto Unified School District.

   Magoon is also working to specify an effective problem-solving model for educational-vocational planning. Magoon seeks a written form of presentation which can be used with several subjects at once. He is presently particularly focussed upon the transistion from school to college.

   Although they have not been present in our Conferences, several of us Conferees are extremely interested in the game context for career mediation with which James Coleman and Sarane Boocock are experimenting.

4. Curricula for Career Competences. Several projects in curriculum development are worthy of specific mention. H. B. Gelatt, Murray Tondow, Barbara Varenhorst, and William Yabroff in cooperation with John Krumboltz at Stanford have led the way in the teaching of decision-making. Their applications have been at the junior high and high school levels in the

Palo Alto Unified School District. These applications have also found union with computer assistance in educational planning as we note below.

A related but different line of effort is that in the Philadelphia and Chicago School Systems. Helen Faust in Philadelphia and Blanche Paulson in Chicago are working with persons in vocational education to develop materials for career, not occupational counseling. Martin Katz, Educational Testing Service, consults with the Philadelphia project. Katz has suggested several skill units which are important for the development of career competence.

Finally, the National Vocational Guidance Association last year sponsored a Conference (1966) of career researchers, curriculum specialists, and vocational educators which made effort to deal with the teaching of career competence in the regular and vocational curricula.

C. Systems Under Development for the Mediation of Vocational Maturation. Two central issues in the mediation of occupational facts/data for the goal of vocational maturation are a) the media through which facts/data are modulated and b) the offering to the inquirer of personal responsibility for goal delineation. When these two necessary conditions are present, a third and possibly final necessary condition becomes relevant, namely the timing and supervision of the mediation and the responsibility. The questions of timing and supervision in the modern technology of education brings the role of the computer into

central focus. The computer can be an instrument of access and presentation under general direction of the programmer and a counselor and the specific direction of the individual inquirer. There are several system approaches to this timing and supervision for occupational facts/data mediation which are represented in the Invitational Conference. They are:

1. Clear Language Print-out of Demographic and Psychometric Data. Thomas Magoon has a project of this name. His efforts will provide a program for an IBM 360-type system which will provide ordinary data for counselors at consoles remote to the 360 computer but present in the counselor's office.

   William Godwin also told the Conference that a still more advanced machine "language" for test interpretation is available at Educational Testing Service under name of PROTRAN. PROTRAN makes it possible to have a clear language print-out of psychometric data which can be given directly to the inquirer, not the counselor.

2. A Pilot Computer Assisted Vocational Guidance Program. Joseph Impelleteri, The Pennsylvania State University, has an operating on-line, computer-assisted vocational guidance program. At the present time, the Impelleteri system is limited to slide presentation and description of occupations. However, the system can be expanded if, and when, film loops, and possibly even movies, can be transmitted via the cables involved in on-line computer assistance of data management and presentation.

3. Information Processing Procedures and Computer-Based Technology in Vocational Counseling. The System Development Corporation, Santa Monica is a pioneer in devising computer-assisted support systems in education. The Autocounselor, the device of Donald Estavan and John Cogswell, has already demonstrated the high potential of on-line computer assistance in educational planning. H. B. Gelatt, John Loughary, and Murray Tondow assisted in the preparation and test of that system in the Palo Alto Unified School District. At the present time, Cogswell and Estavan are assisted by Barbara Rosenquist in the study of vocational guidance in vocational education. These new vocational guidance studies will lead to the fashioning of additional guidance support activities for counselors. They can also lead, in potential, to the fashioning of counselor-like interviews of students in relation to the planning problems inherent in vocational education.

4. Counseling and Support System. The International Business Machines Corporation and the Science Research Associates are presently involved in designing and testing a counseling and guidance support system for use on the IBM System 1500 which may soon be fairly widely available. (This System 1500 is the one particularly noted in a recent Life magazine article on the work of Patrick Suppes and Richard Atkinson at Stanford University.) The System 1500 is ideally adapted to computer assistance in programmed instruction. The IBM-SRA Counseling

and Guidance Support System will probably have many of the elements of computer-assisted instruction as these elements are adaptable to educational and vocational orientation. Their Support System will probably also encompass the numerical and logical processing of data required for the work of the counselor in educational and vocational orientation. Such processing will be limited by the fact of the medium size of the computational and memory units of the processing functions which can be made directly available to the inquirer himself. In addition, the System 1500 will have program, if not direct transmission compatibility, with the larger IBM System 360. Therefore, these plans of the IBM-SRA have considerable implication for us. The System is being developed by Frank Minor of IBM, and Burton Faldett and John Lombard, SRA. Donald Super and Roger Myers are primary consultants, Tiedeman a secondary consultant.

5. Project PLAN. John Flanagan has recently organized Project PLAN within the American Institutes for Research and with the financial support of the Westinghouse Educational Foundation. This project will prepare units for the facilitation of vocational choice and development. The project will also make use of the Project TALENT computer routines to put William Cooley's theory of a measurement system for guidance service at on-line, computer disposal of the counselor.
6. An Information System for Vocational Decisions. As noted

above, we will soon have a new operating IBM-SRA potential at our command. The IBM-SRA system will also have compatability with a larger and later system which Tiedeman and several colleagues are in the process of designing, assembling, and constructing. The Information System for Vocational Decisions is described in detail in Appendix B.

APPENDIX B

A Computer-Based Information System

for Career Decisions[1]

In Prospect for Computer Technology

Professor Ellis invited me to address the matter of prospects for the computer in educational research. I was happy to do so as one of his colleagues[2] in the Harvard-NEEDS-Newton Information System for Vocational Decisions. He and I both hope that our System will materially augment prospect for computer technology in guidance and career development.

The Information System for Vocational Decisions (hereafter ISVD) intends to place an inquirer in potentially repeated interaction with a computer-centered environment programmed for his inquiry, not just for prompt reinforcing of stimulus-response contiguity. The context for the inquiries will be education, occupation, military service, and family living. The inquirer may elect at will among contexts. The System will be constructed so as to expect the inquirer to learn how to harmonize his goals and their consequences by means of repeated inquiries in these four important realms of personal activity.

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1. Speech delivered by David V. Tiedeman in symposium: "Some Prospects for the Computer in Educational Research," AEDS-AERA session on Educational Research, Detroit, Michigan, 3 May 1967. The central portion of this paper has been previously reported as Project Report No. 2.

2. Other Principal Investigators of the Information System for Vocational Decisions are Russell Davis, Richard Durstine, Wallace Fletcher, Edward Landy, Robert O'Hara, and Michael Wilson.

I stress at the outset that the primary goal of the ISVD will be inquiry, not reinforcement. Because our System will intend to put the inquirer in direct relation with his evolving history and intentions to the extent that such can be motivated and represented through the numbers, letters, and processing available in computer reckoning, it becomes possible to avoid one of the fears which the public has of using computers in guidance, namely the fear that computers will determine lives by making decisions for, not with, persons. Our System will let any inquirer experience practically the same joy and frustration which you computer devotees daily do, namely the realization that the answer is in you, not the machine. Despite our occasional regret upon such realizations, we know that we still persevere. Therefore, the assumption of the ISVD will be that any person can and will persevere through inquiry. A further assumption of the ISVD is that repeatedly experienced failure to find full solutions to questions can be fashioned into mature capacity to proceed on inadequate bases in adult life as an inquirer is brought to realize the care we used in fashioning a System which can take him down the path of, but never completely into, awareness of the operation of his motivational system.

I trust that you understand from my remarks that I plan assembly of a System different from that now imagined in computer-aided instruction or in educational data processing. The Information System will subsume those conceptions as intermediate in the condition of education for responsible career decisions. However, our primary professional task will be construction of a meta-system which permits

analysis and response direction in terms of the majority of the variables of this expected responsibility.

How do we intend to do this? That is what I direct the remainder of my remarks toward.

The Career and Choices in Career Development

The context of vocational decision-making offers excellent opportunity for realization of our intention when the computer is given centrality, but necessary incompleteness, in the interacting system in which career development emerges. I define career as personally-given direction in developing vocational activity. I bind a career with expectation that the exercise of personal intention brings with it accountability for self-directed activity. Therefore, I expect that career development requires emergence of self-initiated activity for which a person permits himself to be held to account. When persons do so, we have opportunity to give power to the process of social control by encouraging the <u>in</u>dependence of freedom and the <u>inter</u>dependence of social consciousness.

The forming of career involves a <u>set</u> of decisions which are made throughout life. These decisions are made in the context of education, vocation, military service, and family. The object, plan, and progress of decisions in each of these areas have their own characteristics which I shall comment upon in the next section. The socially-determined choice contexts in which progress in career takes place are as follows:

A. Education. There are six primary choice contexts in which educational histories are forged. Each of these contexts also has a subsidiary context which I shall also note. The primary contexts with their subsidiary contexts are:

1. Choice of secondary school curriculum. The subsidiary choices relate to the kind and level of curriculum and to the specification of skill area within each kind and level.
2. Choice of post-secondary education. Subsidiary choices in a post-secondary education election include the kind and level of opportunity. As final choice of post-secondary education nears, a specific school and/or college must be differentiated from a more general context. This specific differentiation involves choice as a part of a post-secondary education placement function.
3. Choice of a collegiate major. This choice of college major involves choices of kinds of majors and a differentiation of of potential emphasis in terms of analysis, synthesis, and/or reduction to practice in each of the kinds of areas.
4. Choice of a graduate school. This graduate school choice is similar to the choice of a college so I will not repeat further.
5. Choice of graduate specialization. Specialization in graduate school continues the specification of prior college majors in the several areas of knowledge. However, at this time the emphases on analysis, synthesis, and reduction to practice must become clear cut and must be pursued avidly. At the master's level there is likely to be an emphasis on the technology of

a subject; at the doctor's level an emphasis on professional activity.

6. Choices related to the further refining of occupational location by both job and position emphases within general vocational activity. These job and position choices find interrelation with endeavors organized as continuing education.

B. Vocation. There are three primary choice contexts associated with vocational development itself. Each primary context also has its subsidiary contexts. The primary and subsidiary contexts are:

1. Entry Job. This choice involves a first choice of kind and level of occupation. As entry into work nears, the choice must be sufficiently differentiated so that work is initiated in a specific job. This differentiation involves occupational choice with the placement function.

2. Job progress. Choices bringing about job progress initiate emergence of a career. If a person attempts to conceive his job movement in a personal historical context in which he conceives his own vocational activity as progression, he initiates career considerations into his vocational development.

3. Position and career choices. As a person develops a sense of progress in his occupational activity, he begins to focus upon jobs, not occupations; then upon positions, not jobs; and finally upon career, not work. These kinds of choices become salient around midlife if they become salient at all.

C. Military Service. There are three primary kinds of choices

associated with the military service aspect of vocational behavior. These primary contexts are:

1. Kind of service. The person must differentiate between army, navy, marines, coast guard, and air force.
2. Level of service. A prime issue at the beginning of military service is the distinction between enlisted and officer status. Some persons start right off to prepare for officer status. However, in either status, promotion also becomes an issue in its proper time as determined by the regulations of a service.
3. Specialization. Within enlisted ranks in particular, choice of specialization becomes important. In the officer's ranks, specialization is likely to be present but not stressed to that degree in which it is stressed in enlisted ranks.

D. Family. There are two primary contexts for choice in the family area. They are:

1. Marriage. There must be a decision about marriage or not. If marriage is elected, a further decision relates to when in life it should occur and/or re-occur. As noted, the marriage context also involves a choice about continuation in marriage with divorce being the legal means for separation, termination, and potential reinvolvement.
2. Family. Style of life in family is also an area in which choice takes place. This area involves choices of size of family, location of household, culture with regard to extended family living, and amount of balance of time among work, family, and recreation.

The System

General Framework

The Information System for Vocational Decisions is deliberately named despite the fact that our connotations for its words are not presently entirely a matter of common parlance. Our word "Information" is intended to connote the placing of facts/data into the context of use. This use of the word emphasizes our belief that facts/data require the context of use if they are to be conceived as information.

Students and workers are to be permitted to turn educational and occupational facts/data into information through the System. Thus the user becomes an explicit part of our connotation of "System." Our connotation reflects our intention to offer the user complete responsibility in choice of educational and vocational goals. Although it is probably inevitable that the computer will be blamed for "error," we do not intend to let the users of the ISVD enjoy the luxury of that impression without contest.

Data Files

The ISVD will have a data file for each of the previously noted four areas of living: occupation, education, military service, and family. Data in each file are to range from general to specific. In addition, data will attempt both schematically to represent the present and to outline the future for a decade or so, such outlining to be in small time increments. These specifications obligate the System both to deal with local job markets and to incorporate data on local job vacancies

which will be helpful in placement suggestions.

The fifth data file in the System will contain inquirer characteristics. This file will be in two parts. One part will deal with characteristics of inquirers in general and will report on relationships of these characteristics with later choices and successes of those inquirers. This file will be used both to suggest alternatives to users who need wider scope for consideration and to subject aspiration to the test of "reality" when the user is in a condition of clarification of a preferred alternative. The other part of the inquirer characteristic data file will be the private educational and occupational history of the user as portrayed in his context of developing justification for his preferences and their pursuit and consequences.

Decision-making: The Paradigm for Choosing

Reflection upon facts/data of the several areas will be encouraged with the expectation that the facts/data will be put to personal use. The personal use to which these facts/data are put will additionally be expected to become guided by a paradigm of vocational decision-making which I have fashioned with Robert O'Hara. The paradigm essentially conceives decision in relation 1) to the passage of time, and 2) to the undertaking of the risk and activity required to achieve what one elects to achieve. This conception permits division of the time interval into a period of anticipation and a period of accommodation. Anticipation occurs before the activities of a discontinuity become required; accommodation occurs after activity is required. Stages of exploration, crystallization, choice, and clarification are distinguished within the

period of anticipation. Stages of induction, reformation, and integration become possible within the period of accommodation. Distinctions among these stages will have to be a central part of a MONITOR computer routine in the ISVD.

Computer Routines[1]

Computer routines and supporting materials will be fashioned to conform with expectation that this vocational decision paradigm both exists and can become explicit and useful to someone who practices its use. The paradigm will determine the computer routines which we will develop to permit access to each of the data files and to provide data upon request. There will be three primary computer routines: REVIEW, EXPLORATION, and CLARIFICATION.

The REVIEW computer routine will permit call up and comparison of a prior statement about a then future event both after that expected future event has occurred and after the user has provided indication of how his prior expectations were fulfilled before he sees his prior statement of those expectations. The procedure will expect a person to experience insight with regard to consistency, and inconsistency available during comparison, and to learn from such insight that his own intuition guides his activity. The intended outcome of REVIEW is that the user learn from his history.

The EXPLORATION computer routine will allow the person to rove through a data file as near randomly as possible. The routine will encourage use of randomness largely at only general levels of materials

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1. The basis for this plan is due to Allan B. Ellis.

in order to conserve time but will not forbid specific exploration if, and when, desired. Furthermore, routines will be developed to suggest alternatives on the basis of comparison of personal characteristics with established associations between such characteristics of others and their preferred alternatives. The intended outcome from this routine is 1) emergence of a set of alternatives, and 2) the bases on which the alternatives are preferred. I emphasize this latter point in effort to increase your awareness of the reasoning process that is actually involved in career development.

The CLARIFICATION computer routine will be available after specific alternatives are selected. CLARIFICATION will take the user into queries about the depth of his knowledge concerning the then favored alternatives and the understanding of future alternatives which are likely linked with present preferences. The outcome desired from CLARIFICATION will be the dispelling both of some doubt and of some ignorance concerning the next step in the progress of career which the person is evolving. Lessening of both doubt and ignorance is likely to increase the user's confidence in meeting the required activities of his next step.

In addition to the three primary computer routines, MONITOR will be available as the only secondary computer routine. MONITOR will essentially consist of the evaluations which we are able to concoct to determine existence of mastery of stages in the paradigm of vocational decision-making. For this reason, MONITOR must be able to play back into, as well as over, the computer inputs which the person generates. There will be three essential aspects of MONITOR. The first aspect

will be the actual procedure which we concoct and program the computer to provide. The second aspect will be the bases on which we have caused our judgements to operate among the data put in by the person during his interaction with the computer. The third aspect will be the basic computer routines themselves which the person will be taught to use if and when he desires to have them. This aspect will make it possible for the user to write his own monitoring bases to some extent and to have these monitoring procedures play among his material just as ours did originally. We hope through MONITOR to encourage mastery of the concept of feedback and to give practice and supervision in its application.

Materials

The computer routines will incorporate the vocational decision-making paradigm. We do not expect that the computer will itself be sufficient to mature fully the capacity and confidence for use of the decision-making paradigm. We will therefore design two other activities into the System in its totality. One of these other activities will be the simulation of decision-making. Simulation will be available in 1) games, 2) booklets in which the concepts are taught, and 3) decision problems of a vocational nature which must be solved in interaction with the computer.

The second of our other activities which we hope will further mature the use of the paradigm of vocational decision-making will be the actual provision of responsibility for work under laboratory and practice conditions. In laboratory and practice, reality can replace imagination if there is intentful supervision of our users as they practice.

This supervision will probably be of the same nature as that employed by counselors with our users as they are engaged in the simulated activities of vocational decision-making during the user-computer interactions.

Career: The Maturation of Personal Responsibility Through Vocational Development

I have so far attempted to show that the Information System for Vocational Decisions will expect choice and will cultivate the capacity for, and confidence in, choosing by giving users almost infinite possibility for the exercise of decision-making among data files while simultaneously attempting to make the processes of decision-making both explicit and mastered. These are elements in vocational development which have previously neither been unified in this manner nor made available for practice in modes in which complexity is possible but time is not of the essence, at least not the time of persons other than the person engaged in the exercise. The existence of the ISVD will therefore be a first-time physical representation of the "outside" which the person must first learn to bring "inside" and then to act toward knowing that it is there but knowing that he need not be "driven" by it if he is the master of it.

In its totality the ISVD will represent "reality" in its data files, offer processes for working with facts/data through its primary computer routines, and provide practice for integration of a differentiated

condition. The System will provide practice under supervision through 1) its secondary computer routine, 2) its simulation of decision-making, and 3) its personal supervision a) by a counselor of the person in interaction in the computer routine and b) by a vocational educator as the student user assumes real work responsibility in laboratory and practice work situations.

The System's Status and Prospect in Computer Technology

The ISVD has formally existed only since 1 June 1966. Since that time we have 1) assembled necessary personnel, 2) worked out our location in a complex University, and in collaborations with the Newton, Massachusetts School Department, and the New England Education Data Systems, 3) delineated our need for computational equipment, and 4) started the construction of computer routines and materials. We have also necessarily worked through a plan for our next twelve months, all within the first nine months of our own existence.

The ISVD is supposed to be a working prototype by 1 July 1969. During our thirty-seven month project, we intend to bring the System through two generations of a prototype. The intention is to have practically complete and reasonably accurate specifications of an operating computer system for vocational decisions at the conclusion of the project. We will also have a working second generation prototype, of course.

The signs are good that we can make significant progress in

assembling, testing, and further developing our promised prototype. The Radio Corporation of America will figure prominently in our developments. Ellis and I, along with our colleagues, hope that in another two years we may have thereby succeeded in materially increasing the prospects for computer technology in guidance and counseling activities of career development throughout life.

APPENDIX C

Prospects in Mediation:

Commerce in Mediation

As particularly noted in Appendix A, the Office of Education has created a now critical mass of research and development in the mediation of occupational information which causes counselors and vocational educators each to be at a new frontier of their professions. Computer-assistance in the mediation of occupational information may well lose the figurative race between the horse and the steam engine to which John Krumboltz likes to refer. However, we admonish you, as Krumboltz so frequently does, to remember that the race was eventually won by the steam engine. We firmly believe that computer assistance in the mediation of occupational information for vocational maturation will be available and accepted within five years or so. So let's prepare for it. However, let's also be aware of organizations besides the Office of Education which are creating this evolutionary force in the technology of vocational guidance.

Non-profit Organizations. We are only partially aware of research and development centers around the United States which are engaged in the assembly and provision of computer-assisted support systems for vocational decision-making. However, we do know of several organizations of such nature.

The System Development Corporation, Santa Monica, engages in the development of support systems in education. Furthermore, as noted in Appendix A, Cogswell, Estavan, and Rosenquist are presently engaged at

that Corporation in enlarging the context of support for vocational guidance.

Actually, the support routines which Cooley and Lohnes have evolved for analyzing the data of Project TALENT also constitute a resource for research in vocational guidance. Some of those support routines will probably be put into the Information System for Vocational Decisions for selective use by inquirers. (It just seems to us that others should be able to learn as much about their careers as Cooley and Lohnes did about theirs as they engaged in the analysis of the career data of Project TALENT.)

The New England Education Data Systems is a membership organization of some 64 school systems in New England. These organizations pay an annual fee on a per pupil basis. The fee entitles members to the services of the NEEDS. These NEEDS service systems presently provide computer assistance for pupil accounting and class scheduling. The development of the ISVD in cooperation with the NEEDS will potentially expand the repertoire of assistance available through that organization. The NEEDS is also simultaneously involved in research intended to expand on-line computer assistance for both instruction and educational administration.

The Educational Testing Service and the College Entrance Examination Board are considering further expansion of operation into the computer mediation of testing and reporting systems. Also, the Measurement Research Center and its subsidiary Systems already have well developed and operating pupil testing, accounting, and reporting routines.

Universities such as California (Santa Barbara), Florida State, Harvard, Maryland, Pennsylvania State, and Stanford are also already developing guidance and counseling support systems.

Profit Organizations. Those of us in guidance seem to be relatively unaware of the entry into our field of profit-making organizations other than those which have made their money on tests and occupational materials. Book, media, and computer companies are looking carefully at developments in counseling and guidance support systems. Let us in our turn, take a look at them.

IBM-SRA is likely to be the first orgainzation to market a counseling and guidance support system. We have mentioned this system in Appendix A. We merely remind us here that a large corporation is interested in our fortunes if we provide a way for them to cultivate that interest for their profit.

Westinghouse has also just entered into an agreement with the American Institutes for Research. This agreement calls for the creation of school relations with AIR which are potentially akin to those we have described for NEEDS. However, at the present time the relationships merely call for free consultation and collaboration in the development and test of the Westinghouse-AIR Project PLAN. The System is presently planned primarily as an on-line, computer-assisted, support system for just the counselor, not for student inquirers. However, there will eventually be computer-assisted units on vocational development which are prepared for student use.

The General Electric and Time and Life amalgam which gave rise to

the General Learning Corporation is also a potential resource for construction of computer-assisted systems in support of counseling and guidance. At the present time, GLC's available General Electric time-shared computer is one of the few operating realities of its kind even though its applications are only of a business variety.

The Radio Corporation of America supports research and development in computer assistance in education both at Stanford University and the New England Education Data Systems. This support on the part of RCA will probably permit the ISVD project to secure computer access which is reasonably advantageous to our grantor, the Office of Education.

This list is not exhaustive. Other computing companies are watching developments in this field and will move in with us as our technologies become financially profitable. Companies which provide the hardware and software for media are helping and watching in these developments. Sanders Associates is a good example in the hardware line; Follett Publishing Company which recently incorporated the interests of John Loughary, Harold W. Phend, and Murray Tondow, are good examples in the software line. Large publishing houses which have not had to consolidate with other industries to keep their competitive advantage are also interested and willing to help. McGraw-Hill Book Company and its educational division is a prime example of this kind. Guidance Associates are already well developed in occupational mediation.

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